

Advanced Algebra
Inequalities

Name Ken
Hour _____ Date _____

1. Graph: $y < x^2 - 8x + 7$

Vertex: $(4, 9)$

Axis of symmetry: $x = 4$

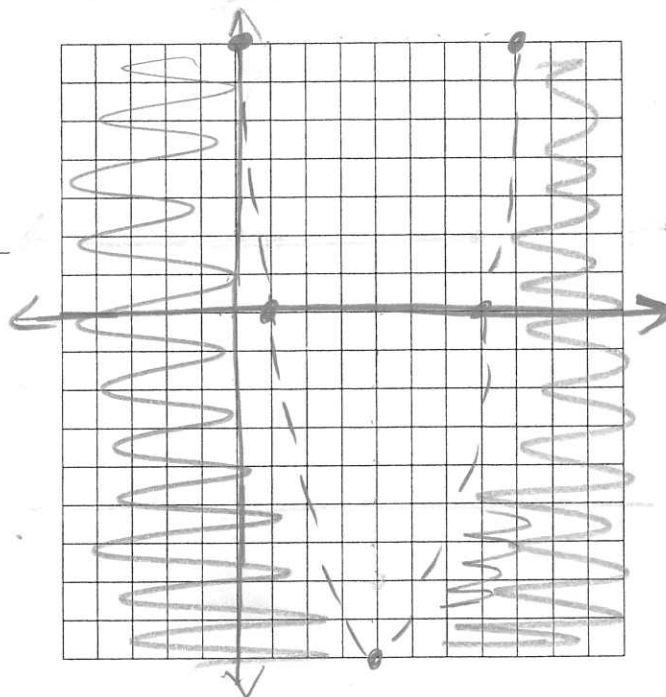
x-intercepts $(7, 0)$, $(1, 0)$

y-intercept $(0, 7)$

point of reflection: $8, 7$

$$4^2 - 32 + 7$$

$$16 - 32 + 7$$



2. Write the quadratic function that models the parabola that passes through the points

$(1, 0)$; $(2, 3)$; $(3, 10)$.

$$0 = a + b + c$$

$$3 = 4a + 2b + c$$

$$10 = 9a + 3b + c$$

$$0 = -a - b - c$$

$$3 = 4a + 2b + c$$

$$3 = 3a + b$$

$$0 = -a - b - c$$

$$10 = 9a + 3b + c$$

$$10 = 8a + 2b$$

$$-6 = -6a - 2b$$

$$10 = 8a + 2b$$

$$0 = 2 - 3 + c$$

$$0 = -1 + c$$

$$c = 1$$

$$4 = 2a$$

$$a = 2$$

$$-6 = -6(2) - 2b$$

$$-6 = -12 - 2b$$

$$6 = -2b$$

$$b = -3$$

$$y = 2x^2 - 3x + 1$$

Solve each inequality. Write your answer as an inequality.

4. $x^2 - 7x - 18 > 0$

$$(x - 9)(x + 2) \geq 0$$



$$x \leq -2 \text{ or } x > 9$$

5. $2x^2 - 6x - 8 < 0$

$$\frac{-8 \pm \sqrt{16}}{-6 \pm 2}$$



$$2x^2 - 8x + 2x - 8$$

$$2x(x - 4) + 2(x - 4)$$

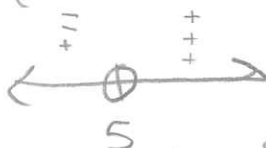
$$(2x + 2)(x - 4) < 0$$

$$x = -1 \quad x = 4$$

$$-1 \leq x \leq 4$$

6. $x^2 - 10x + 25 < 0$

$$(x - 5)(x - 5) < 0$$

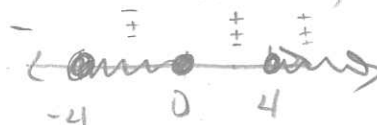


no solution

Extra Credit: $x^3 - 16x \geq 0$

$$x(x^2 - 16) \geq 0$$

$$x(x + 4)(x - 4) \geq 0$$



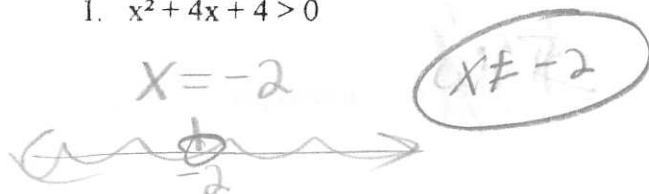
$$-4 \leq x \leq 0 \text{ or } x \geq 4$$

Advanced Algebra
Graphing Quadratic Inequalities

Name key
Hour _____

Graph each quadratic inequality.

1. $x^2 + 4x + 4 > 0$



2. $x^2 - 7x + 10 < 0$

$(x-5)(x-2) < 0$
 $x=5$ $x=2$
 $2 < x < 5$

3. $x^2 - 8 \leq -7x$ $x^2 + 7x - 8 \leq 0$



4. $x^2 + 2x \geq 35$

$x^2 + 2x - 35 \geq 0$
 $(x+7)(x-5) \geq 0$

5. $x^2 - 14x + 29 > 5$

$x^2 - 14x + 24 > 0$
 $(x-12)(x-2) > 0$

6. $2x^2 - 7x - 11 \leq -8 - 2x$

$2x^2 - 5x + 3 \leq 0$
 $(2x^2 - 3x) + (-2x + 3) \leq 0$
 $x(2x-3) - 1(2x-3) \leq 0$
 $(x-1)(2x-3) \leq 0$

7. $x^2 - 5x \geq x$

$x^2 - 6x \geq 0$
 $x(x-6) \geq 0$

8. $4x^2 < 4x + 15$

$4x^2 - 4x - 15 \leq 0$
 $(4x^2 - 10x) + (6x - 15) \leq 0$
 $2x(2x-5) + 3(2x-5) \leq 0$
 $2x+3=0$ $2x-5=0$
 $x = -3/2$ $x = 5/2$

9. $x^3 \leq 36x$

$x^3 - 36x \leq 0$
 $x(x^2 - 36) \leq 0$
 $x(x-6)(x+6) \leq 0$

10. $16x^2 + 44x - 42 > 0$

$2(8x^2 + 22x - 21) > 0$